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FLOOD INSURANCE STUDY

LAWRENCE COUNTY, OHIO

UNINCORPORATED AREAS

SEPTEMBER 29, 1989

Federal Emergency Management Agency

COMMUNITY NUMBER - 390325

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

LAWRENCE COUNTY,
UNINCORPORATED AREAS,
OHIO

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Unincorporated Areas of Lawrence County, Ohio, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by Dodson-Lindblom Associates, Inc. (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Contract No. EMW-86-C-2232. This study was completed in July 1987.

Floodway and cross-section data for the Ohio River were taken from the Flood Insurance Studies for the City of Catlettsburg and Boyd and Greenup Counties, Kentucky, and Cabell County, West Virginia (References 1-4).

1.3 Coordination

On January 30, 1986, an initial coordination meeting was held with representatives of FEMA, Lawrence County, and the Study Contractor.

On November 22, 1988, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Lawrence County, Ohio. The area of study is shown on the Vicinity Map (Figure 1). The incorporated areas within the county were excluded from this study.

Flooding caused by overflow of the Ohio River, Symmes Creek, Indian Guyan Creek, McKinney Creek, and Wolf Creek was studied in detail.

Areas having low development potential or minimal flood hazards were previously studied using approximate analyses. The results were shown on the Flood Hazard Boundary Map for Lawrence County, Ohio (Reference 5) and are incorporated into this Flood Insurance Study.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through July 1992. The scope and methods of study were proposed to and agreed upon by FEMA and Lawrence County.

2.2 Community Description

Lawrence County is in southern Ohio and is bordered on the north by Jackson County, Ohio; on the west by Scioto County, Ohio; on the east by Gallia County, Ohio; and on the south by the Towns of Ceredo and Kenova, the City of Huntington, and Cabell and Wayne Counties, West Virginia; Boyd County and the Cities of Ashland and Catlettsburg, Kentucky; and Greenup County and the Cities of Wurtland, Worthington, Flatwoods, and Russell, Kentucky. All the communities on the southern border of Lawrence County lie along the Ohio River.

Lawrence County is served by U.S. Route 52, State Routes 7, 93, 141, 217, 243, 522, 650, and 775, and the Norfolk Southern Railway. The 1980 population of Lawrence County was reported to be 63,849 (Reference 6).

Approximately 71 percent of Lawrence County is wooded. Most of the remaining area is used for agriculture. The terrain in most of the county is hilly, except for the Ohio River Valley.

The Ohio River, as it flows to the Lawrence County floodplains, drains an area of about 60,000 square miles, collecting runoff from as far away as the headwaters of the Allegheny River in southwestern New York State. The Allegheny River joins the Monongahela River at the City of Pittsburgh, Pennsylvania, to form the Ohio River, 325 river miles from the City of Ironton, Ohio, in Lawrence County. During floods, the river rises slowly and remains out of its banks for a considerable amount of time. The depth of the Ohio River in Lawrence County is kept at a navigable level by the Greenup Dam, which has no measurable effect on flooding.

The U.S. Army Corps of Engineers (COE) is responsible for flood control projects and navigation facilities for the Ohio River. The distance from the

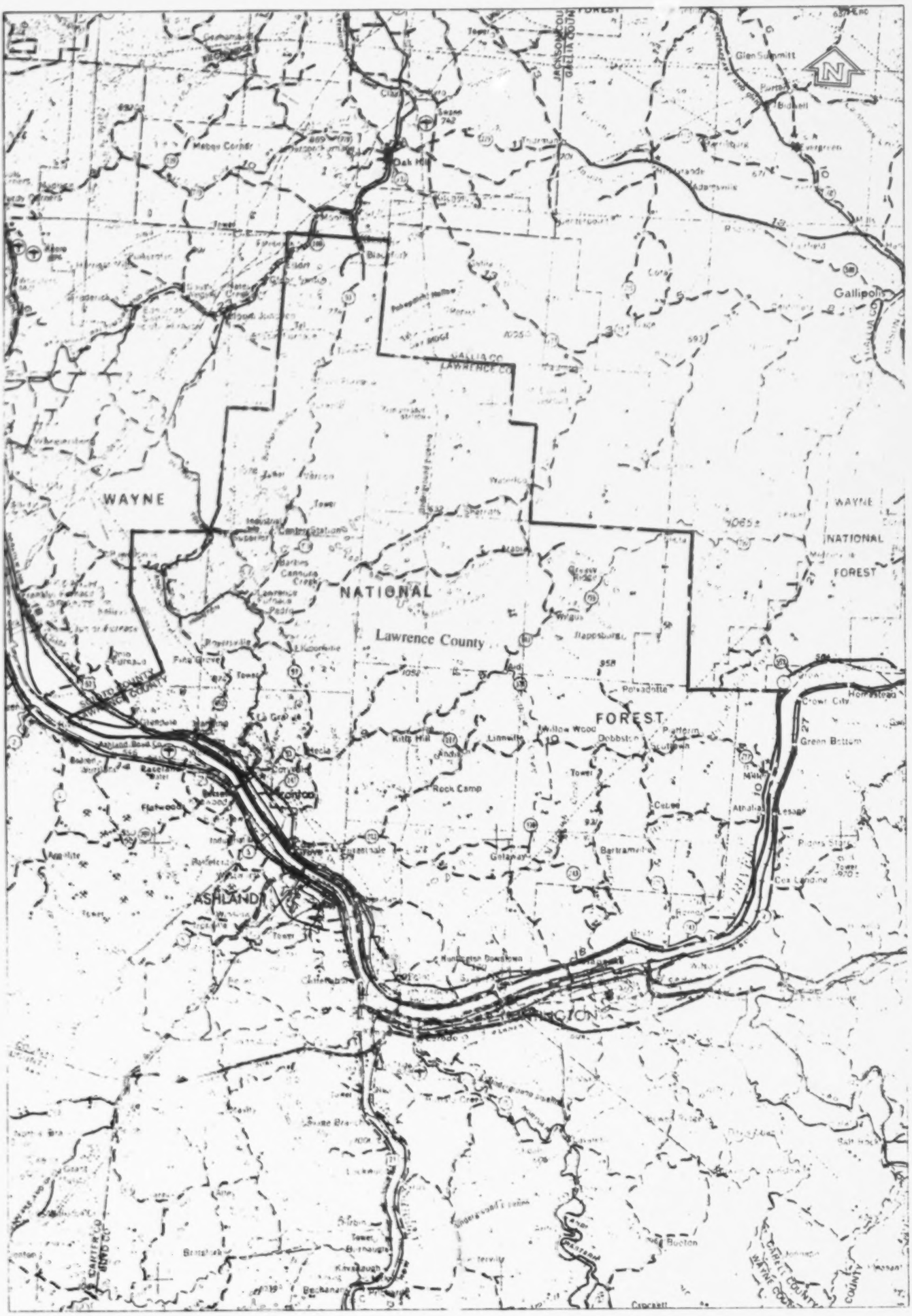

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

APPROXIMATE SCALE
4 0 4 8 12 MILES

VICINITY MAP

beginning of the river at Pittsburgh to its confluence with the Mississippi River at the City of Cairo, Illinois, is 981 miles. The drainage area is 19,100 square miles at Pittsburgh and 203,940 square miles at Cairo. The Ohio River falls 429 feet in its course from Pittsburgh to Cairo. It generally flows in a southwesterly direction, but varies considerably from south to north in relatively short reaches. The valley is rather narrow for the size of the drainage area, reflecting glacial changes. The average width of the valley ranges from less than 0.5 mile in the reach between Pittsburgh and the City of Wheeling, West Virginia, to more than 1 mile between the City of Cincinnati, Ohio, and the City of Louisville, Kentucky. At Louisville, it widens to about 4 miles and then contracts to 1 mile below the Salt River. Near the mouth of the Ohio River, the valley again widens to 6 to 8 miles. Elevations vary from 100 feet National Geodetic Vertical Datum of 1929 (NGVD) to 600 feet NGVD below the plateaus surrounding the valley. The only falls are at Louisville, where a 25-foot difference in water-surface elevations between the upper and lower pools existed prior to the canalization of the Ohio River.

2.3 Principal Flood Problems

Major Ohio River floods are caused by excessive rainfall in the basin during the widespread storms that occur in the winter and spring. Floods rise to their crests very slowly and remain above bankfull stage for extended periods. For example, the 1937 flood took 12 days to rise to its crest and remained out of banks for over 2 weeks. The much smaller flood of March 1967 rose to its crest in 5 days and remained out of banks for over a week. The maximum rate of rise during a major flood is normally less than 0.5 foot per hour (Reference 7).

Newspaper accounts and other historical records show that large Ohio River floods occurred in 1806, 1832, 1847, 1852, 1865, 1872, 1880, and 1884. Major floods also occurred in 1913, 1936, 1937, 1945, 1950, and 1963. Lesser floods over the past two centuries are too numerous to list (Reference 7).

PAST FLOOD CREST ELEVATIONS

DATE OF CREST	ESTIMATED PEAK (MAXIMUM) DISCHARGE (CFS*)	ELEVATION (FEET NGVD)
At USGS Gaging Station at Old Lock and Dam No. 28		
January 27, 1937	654,000	559.2
March 31, 1913	N/A	556.0
February 12, 1884	N/A	554.4
April 17, 1948	554,000	551.4
At USGS Gaging Station at Ashland, Kentucky		
January 27, 1937	690,000	555.3
March 31, 1913	669,000	551.8
February 12, 1884	620,000	550.5
April 17, 1948	589,000	547.0

* cubic feet per second

2.4 Flood Protection Measures

Earthen levees and floodwalls constructed in Ironton by the COE between 1938 and 1943 protect the county from a 100-year flood on the Ohio River. The levees and floodwalls extend several feet above the flood stages attained during the 1937 flood. The levees and floodwalls have been operated and maintained by the City of Ironton since 1943.

Canalization of the Ohio River was completed in 1929. The original system of 46 locks and dams is being replaced by 19 authorized or completed higher lift structures. In 1981, there were still 20 locks and dams to be replaced. The new structures are navigation aids that will essentially have no effect on flood stages because their gates will remain fully open.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

The 100-year discharges for Symmes Creek, McKinney Creek, Indian Guyan Creek, and Wolf Creek were determined using regression equations presented in Bulletin No. 45 (Reference 8). Those equations relate drainage area and channel slope to peak discharges.

Flood discharges for the Ohio River were determined by the COE from flow-frequency data obtained at various stream gaging stations on the Ohio River.

Peak discharge-drainage area relationships for the 100-year flood of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 100-YEAR
MCKINNEY CREEK		
at mouth	4.96	2,060
SYMMES CREEK		
just downstream of confluence of McKinney Creek	345	12,080
WOLF CREEK		
at mouth	4.66	1,820
INDIAN GUYAN CREEK		
just downstream of confluence of Fourmile Creek	69.17	6,310
just downstream of confluence of Wolf Creek	62.16	5,990
OHIO RIVER		
at Ashland	60,750	586,000
at Huntington	55,900	560,000

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross-section data for the backwater analyses of Symmes Creek, McKinney Creek, Indian Guyan Creek, and Wolf Creek were obtained from field surveys and topographic maps. The channel sections were field surveyed and the overbank sections were obtained from topographic maps compiled from aerial photographs (Reference 9). All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Roughness coefficients (Manning's "n") were estimated from aerial photographs and field reconnaissance of the study area.

The 100-year flood elevations along Symmes Creek, McKinney Creek, Indian Guyan Creek, and Wolf Creek were computed using the HEC-2 step backwater computer program (Reference 10). Starting water-surface elevations for Symmes Creek and Indian Guyan Creek were established using the slope-area method. The starting water-surface elevation for McKinney Creek was determined using the 100-year flow for McKinney Creek in the HEC-2 model for Symmes Creek and taking the elevation computed at the confluence of Symmes and McKinney Creeks as the starting water-surface elevation for McKinney Creek. Likewise, a starting water-surface elevation for Wolf Creek was computed using the Indian Guyan Creek HEC-2 model. The 10-, 50-, and 100-year flood elevations along the Ohio River were obtained from the COE (Reference 11). The Ohio River 500-year flood elevation was estimated from flow-frequency data provided by the COE for various gaging stations on the Ohio River and from the 100-year and January 1937 flood profiles, also provided by the COE (Reference 11).

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100-year profile has been shown.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the NGVD. Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections for the Ohio River, the boundaries were interpolated using topographic maps reduced to a scale of 1:12000 with a contour interval of 5 feet (Reference 12). Between cross sections for the remaining streams, the boundaries were interpolated using topographic maps at a scale of 1:4800 with a contour interval of 4 feet, compiled from aerial photographs (Reference 9).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary was delineated using the Flood Hazard Boundary Map for Lawrence County (Reference 5).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways for this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 2, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway for the Ohio River lie outside the county boundary.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the base flood elevations at any point within the community.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
OHIO RIVER								
A	334.0	2550	112,152	5.7	543.3	543.3	544.2	0.9
B	333.0	3068	122,895	5.2	543.6	543.6	544.5	0.9
C	322.0	1254	74,606	7.8	547.4	547.4	548.3	0.9
D	321.5	1446	85,544	6.8	547.9	547.9	548.8	0.9
E	321.0	1571	96,607	6.1	548.2	548.2	549.1	0.9
F	320.7	1410	90,146	6.5	548.3	548.3	549.2	0.9
G	320.5	1515	91,159	6.4	548.4	548.4	549.3	0.9
H	319.9	1655	97,762	6.0	548.6	548.6	549.5	0.9
I	319.5	1640	96,560	6.1	548.8	548.8	549.7	0.9
J	319.1	1680	83,678	7.0	548.8	548.8	549.7	0.9
K	319.0	1645	94,476	6.2	549.0	549.0	549.9	0.9
L	318.5	1530	87,630	6.7	549.1	549.1	550.0	0.9
M	318.0	1615	85,001	6.9	549.3	549.3	550.2	0.9
N	303.5	1543	91,776	6.0	555.0	555.0	556.0	1.0
O	303.0	1495	87,396	6.3	555.2	555.2	556.2	1.0
P	302.5	1370	81,648	6.7	555.3	555.3	556.3	1.0
Q	302.0	1385	80,758	6.8	555.5	555.5	556.5	1.0
R	301.5	1771	95,944	5.7	555.9	555.9	556.9	1.0
S	301.0	1821	95,473	5.8	556.1	556.1	557.1	1.0
T	300.5	1543	88,053	6.2	556.2	556.2	557.2	1.0
U	300.0	1586	88,185	6.2	556.4	556.4	557.4	1.0
V	299.5	1348	82,284	6.7	556.5	556.5	557.5	1.0
W	299.0	1352	84,077	6.5	556.7	556.7	557.7	1.0
X	298.5	1675	91,020	6.0	557.0	557.0	558.0	1.0
Y	298.0	1861	91,724	6.0	557.1	557.1	558.1	1.0
Z	297.5	2260	91,469	6.0	557.3	557.3	558.3	1.0

[1]MILES BELOW HEADWATERS AT PITTSBURGH
[2]THIS WIDTH EXTENDS BEYOND COUNTY BOUNDARY

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOODWAY DATA

OHIO RIVER

CROSS SECTION	DISTANCE	FLOODWAY WIDTH (FEET)	FLOODWAY SECTION AREA (SQ. FEET)	FLOODWAY MEAN VELOCITY (FEET/SEC)	BASE FLOOD WATER-SURFACE ELEVATION REGULATORY (FEET NGVD)	BASE FLOOD WATER-SURFACE ELEVATION WITHOUT FLOODWAY (FEET NGVD)	BASE FLOOD WATER-SURFACE ELEVATION WITH FLOODWAY (FEET NGVD)	BASE FLOOD WATER-SURFACE ELEVATION INCREASE (FEET)
OHIO RIVER								
AA	295.5	1185[3]	80,086	6.9	558.0	558.0	559.0	1.0
AB	295.0	1279[3]	80,483	6.8	558.2	558.2	559.2	1.0
AC	294.5	1556[3]	93,219	5.9	558.5	558.5	559.5	1.0
AD	294.0	1340[3]	84,238	6.5	558.6	558.6	559.6	1.0
AE	293.5	1150[3]	78,728	7.0	558.7	558.7	559.7	1.0
AF	293.0	1100[3]	69,354	7.9	558.8	558.8	559.8	1.0
INDIAN GUYAN RIVER								
A	28,950[2]	350	3643	1.7	554.2	552.0[4]	553.0	1.0
B	30,735[2]	350	2391	2.6	554.2	552.2[4]	553.2	1.0
C	32,060[2]	400	3302	1.9	554.2	552.7[4]	553.7	1.0
D	34,485[2]	420	2896	2.2	554.2	553.3[4]	554.3	1.0
E	35,585[2]	250	1664	3.8	554.2	553.7[4]	554.7	1.0
F	37,380[2]	240	1660	3.6	555.3	555.3	556.3	1.0
G	38,545[2]	220	1575	3.8	556.3	556.3	557.3	1.0
H	40,230[2]	220	1591	3.8	557.9	557.9	558.7	0.8
I	42,065[2]	220	1603	3.7	559.3	559.3	560.1	0.8
J	44,225[2]	230	1691	3.5	560.7	560.7	561.7	1.0
K	45,315[2]	230	1513	4.0	561.5	561.5	562.5	1.0
L	46,560[2]	200	1436	4.2	562.9	562.9	563.7	0.8
M	47,275[2]	230	1809	3.3	564.2	564.2	564.9	0.7
N	48,960[2]	230	1724	3.5	565.0	565.0	565.9	0.9
O	50,140[2]	200	1481	4.0	565.7	565.7	566.7	1.0

[1]MILES BELOW HEADWATERS AT PITTSBURGH
[2]FEET ABOVE MOUTH
[3]THIS WIDTH EXTENDS BEYOND COUNTY BOUNDARY
[4]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM OHIO RIVER

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOODWAY DATA

OHIO RIVER–INDIAN GUYAN RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
SYMMES CREEK								
A	42,300	484	4333	2.8	553.1	552.0[2]	553.0	1.0
B	44,525	762	6505	1.9	553.1	552.6[2]	553.6	1.0
C	46,020	519	4238	2.9	553.1	552.8[2]	553.8	1.0
D	48,240	447	4239	2.8	553.4	553.4	554.4	1.0
E	50,540	558	5160	2.3	554.1	554.1	555.1	1.0
F	52,375	341	2915	4.1	554.7	554.7	555.7	1.0
G	53,950	100	1769	6.8	556.2	556.2	556.9	0.7
H	55,665	95	1738	7.0	557.5	557.5	558.3	0.8
I	56,810	184	2209	5.5	558.5	558.5	559.5	1.0
J	58,330	130	2192	5.5	559.5	559.5	560.5	1.0
K	59,395	130	2109	5.7	560.2	560.2	561.1	0.9
L	61,940	275	3324	3.6	562.2	562.2	563.1	0.9
M	63,290	578	7287	1.6	562.8	562.8	563.8	1.0
MCKINNEY CREEK								
A	2435	85	477	4.3	553.9	553.7[3]	554.3	0.6
B	3115	106	545	3.8	554.6	554.6	555.6	1.0
C	4380	120	566	3.6	557.2	557.2	558.1	0.9
D	5350	130	623	3.3	559.8	559.8	560.7	0.9
E	5885	170	711	2.9	560.5	560.5	561.5	1.0
F	7455	120	628	3.3	566.7	566.7	567.7	1.0
G	8420	75	308	6.7	568.7	568.7	569.7	1.0
H	10,240	75	402	5.1	576.4	576.4	577.4	1.0

[1]FEET ABOVE MOUTH
[2]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM OHIO RIVER
[3]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM SYMMES CREEK

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOODWAY DATA

SYMMES CREEK–MCKINNEY CREEK

//

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
WOLF CREEK								
A	325	32	233	7.8	563.0	560.4[2]	561.3	0.9
B	1370	48	377	4.8	566.3	566.3	566.8	0.5
C	2005	55	499	3.6	566.8	566.8	567.6	0.8
D	2665	99	638	2.9	567.2	567.2	568.1	0.9
E	3155	83	516	3.5	567.6	567.6	568.6	1.0
F	3920	77	402	4.5	568.6	568.6	569.6	1.0
G	4625	77	441	4.1	571.7	571.7	572.6	0.9
H	5900	80	300	6.1	574.5	574.5	575.5	1.0
I	7110	112	409	4.5	579.4	579.4	580.1	0.7
J	8270	55	285	6.4	583.9	583.9	584.9	1.0
K	9010	85	401	4.5	586.5	586.5	587.4	0.9

[1]FEET ABOVE MOUTH
[2]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM INDIAN GUYAN CREEK

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOODWAY DATA

WOLF CREEK

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

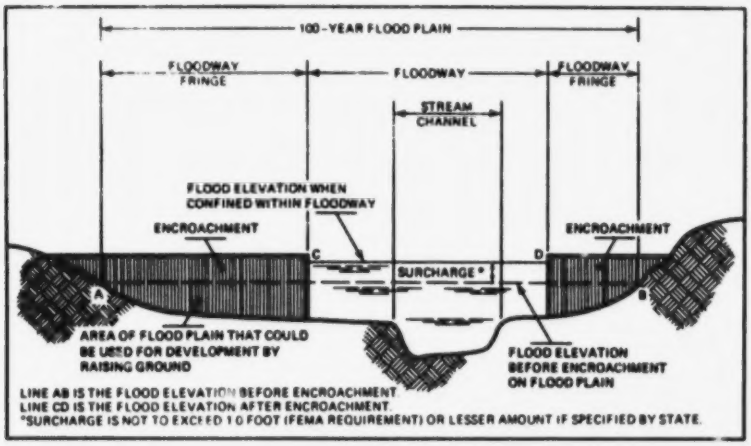
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FIGURE 2 - Floodway Schematic

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

The profiles and elevations contained in a COE Floodplain Information report for the Ohio River in Lawrence County (Reference 7) do not agree with those in this study. That report is superseded by new profiles published by the COE, Ohio River Division (Reference 11) that are in agreement with this study.

The Flood Insurance Studies published for the Villages of Athalia, Chesapeake, Coal Grove, Hanging Rock, Proctorville, and South Point, Ohio (References 13-18); the City of Ironton, Ohio (Reference 19); and Jackson County, Ohio (Reference 20) are in agreement with this study.

The Flood Insurance Studies published for the Cities of Ashland, Wurtland, Worthington, and Catlettsburg, Kentucky (References 21-23 and 1); and Boyd and Greenup Counties, Kentucky (References 2 and 3) are also in agreement with this study.

The Flood Insurance Studies published for the City of Huntington and Cabell County, West Virginia (References 24 and 4) and Scioto County, Ohio (Reference 25) are also in agreement with this study.

The Flood Insurance Study in progress for Gallia County, Ohio (Reference 26) is in agreement with this study.

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for Lawrence County (Reference 5).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 175 West Jackson Boulevard, 4th Floor, Chicago, Illinois 60604-2698.

9.0 REFERENCES AND BIBLIOGRAPHY

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2. ————, Federal Insurance Administration, Flood Insurance Study, Boyd County, Unincorporated Areas, Kentucky, December 1980.

3. ————, Flood Insurance Study, Greenup County, Unincorporated Areas, Kentucky, January 1983.

4. ————, Flood Insurance Study, Cabell County, Unincorporated Areas, West Virginia, September 1987.

5. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Lawrence County, Unincorporated Areas, Ohio, June 1978.

6. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Ohio, Washington, D.C., February 1982.

7. ————, Flood Plain Information, Ohio River, Lawrence County, Ohio, June 1973.

8. Ohio Department of Natural Resources, Division of Water, Bulletin No. 45, Floods in Ohio-Magnitude and Frequency, E.E. Webber and W.P. Bartlett, Jr., May 1977.

9. Benatec and Associates, Aerial Photographs, Scale 1:12000, Contour Interval 4 Feet: Lawrence County, Ohio, March 1986.

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12. ----------, Greenup Locks and Dam Pool-Ohio River-Topographic and Property Survey - Ohio, Kentucky, and West Virginia, Scale 1:12000, Contour Interval 5 Feet, March 1959.

13. Federal Emergency Management Agency, Flood Insurance Study, Village of Athalia, Lawrence County, Ohio, September 1983.

14. ————, Flood Insurance Study, Village of Chesapeake, Lawrence County, Ohio, October 1983.

15. ————, Flood Insurance Study, Village of Coal Grove, Lawrence County, Ohio, July 1983.

16. ————, Flood Insurance Study, Village of Hanging Rock, Lawrence County, Ohio, September 1983.

17. ————, Flood Insurance Study, Village of Proctorville, Lawrence County, Ohio, August 1984.

18. ————, Flood Insurance Study, Village of South Point, Lawrence County, Ohio, May 1983.

19. ————, Flood Insurance Study, City of Ironton, Lawrence County, Ohio, July 1983.

20. ————, Flood Insurance Study, Jackson County, Unincorporated Areas, Ohio, August 1985.

21. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Ashland, Boyd County, Kentucky, September 1978.

22. Federal Emergency Management Agency, Flood Insurance Study, City of Wurtland, Greenup County, Kentucky, September 1981.

23. ————, Flood Insurance Study, City of Worthington, Greenup County, Kentucky, September 1981.

24. ————, Flood Insurance Study, City of Huntington, Cabell County, West Virginia, August 1981.

25. ————, Flood Insurance Study, Scioto County, Unincorporated Areas, Ohio, June 1989.

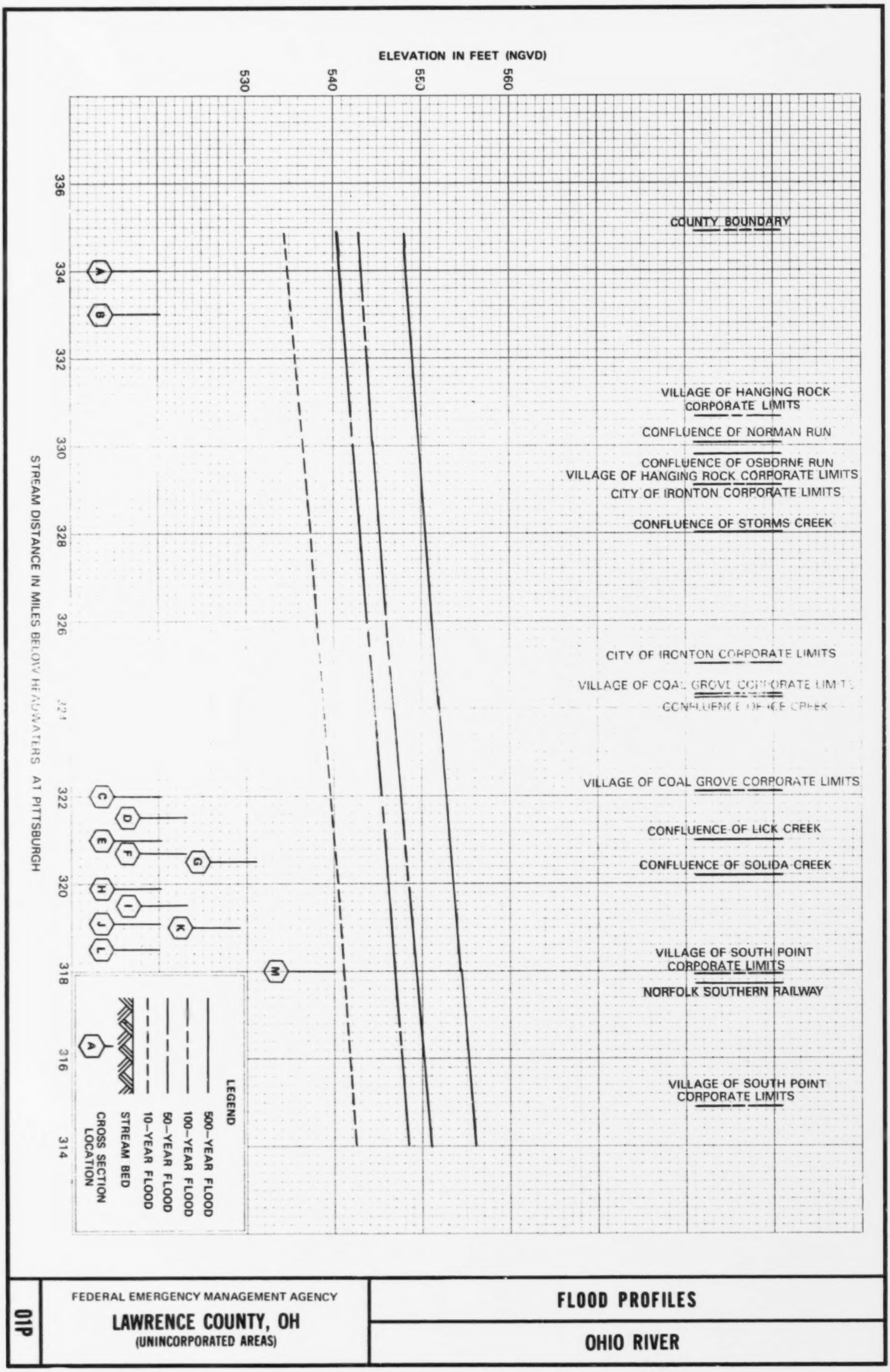
26. ————, Flood Insurance Study, Gallia County, Unincorporated Areas, Ohio, in progress.

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0140	550.44	chiseled square in southeast corner of concrete deck of County Route 69 bridge over Indian Guyan Creek
2	0140	568.57	chiseled square in downstream corner of east abutment of County Route 65 bridge over Indian Guyan Creek
3	0140	567.33	head of top bolt with hook at upstream end of State Route 775 bridge over Wolf Creek
4	0140	550.17	disk set in top of southeast corner of 10-foot box culvert about 0.9 mile southeast along State Route 243 from State Route 243 bridge over McKinney Creek
5	0140	559.27	disk set in top of northeast end of southeast abutment of State Route 243 bridge over McKinney Creek
6	0140	562.69	disk set in top of concrete portion of east stone and concrete abutment of State Route 243 bridge over Symmes Creek
7	0140	559.28	chiseled square on downstream corner of left abutment of private road bridge over McKinney Creek, about 600 feet north of intersection of County Route 36 and Township Road 187
8	0140	557.96	chiseled square on downstream corner of left wingwall of B.A.R. Enterprises bridge over McKinney Creek
9	0140	573.99	chiseled square on left upstream side of concrete deck of private road bridge over McKinney Creek, about 1,200 feet southwest along County Route 36 from intersection of County Route 36 and Township Road 229

ELEVATION REFERENCE MARKS (Continued)

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
10	0140	573.99	U.S. Geological Survey (USGS) disk set in top of concrete post located about 1.6 miles southeast along State Route 243 from State Route 243 bridge over McKinney Creek
11	0140	552.21	U.S. Coast and Geodetic Survey (USCGS) disk set in top of northeast corner of 8-foot box culvert located about 2.6 miles southeast along State Route 243 from State Route 243 bridge over McKinney Creek
12	0140	563.64	USGS tablet set in stop of concrete post located along County Route 69 about 1.2 miles northeast of intersection of County Route 69 and State Route 243
13	0180	541.64	USGS disk set in top of concrete post located just northeast of State Route 243 and County Route 32
14	0180	552.53	USCGS disk set in top of concrete post located just southwest of Sky Lake, about 0.7 mile south along County Route 32 from bridge over Symmes Creek
15	0180	542.33	USCGS disk set in northeast corner of deck of Township Road 104 bridge over Symmes Creek
16	0145	582.01	PK nail set in wood headwall at northeast corner of Township Road 149 bridge over Wolf Creek



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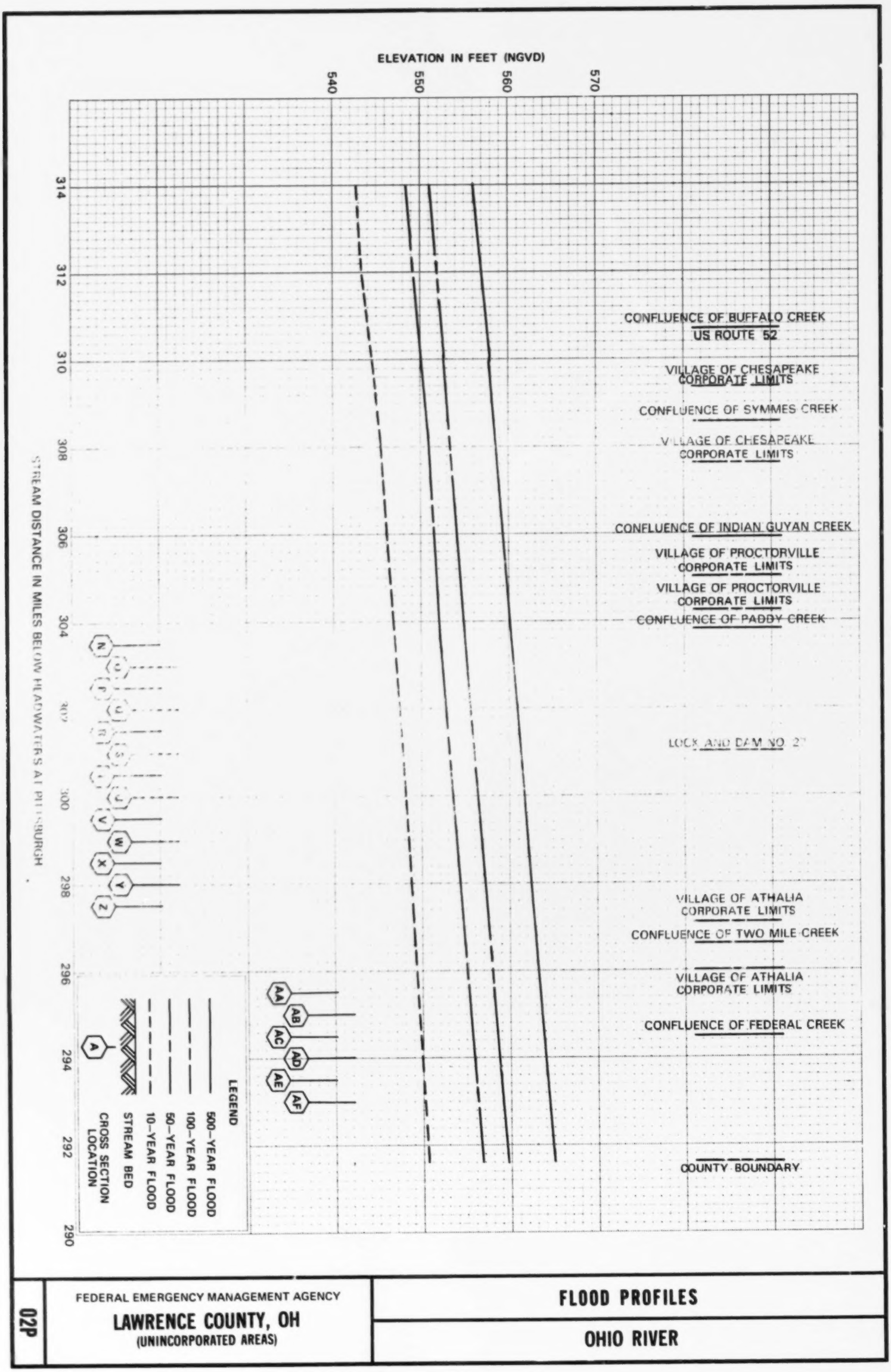

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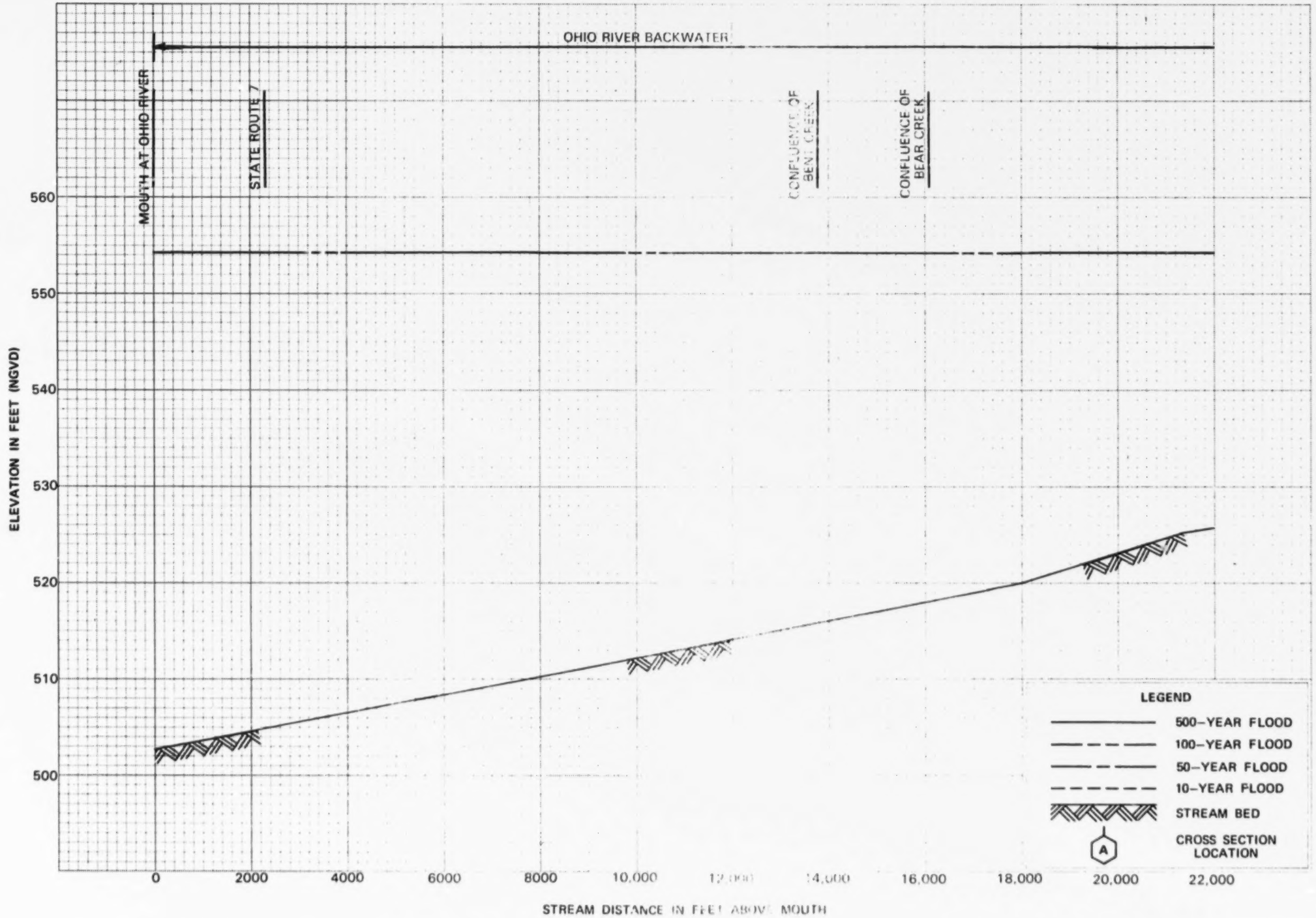


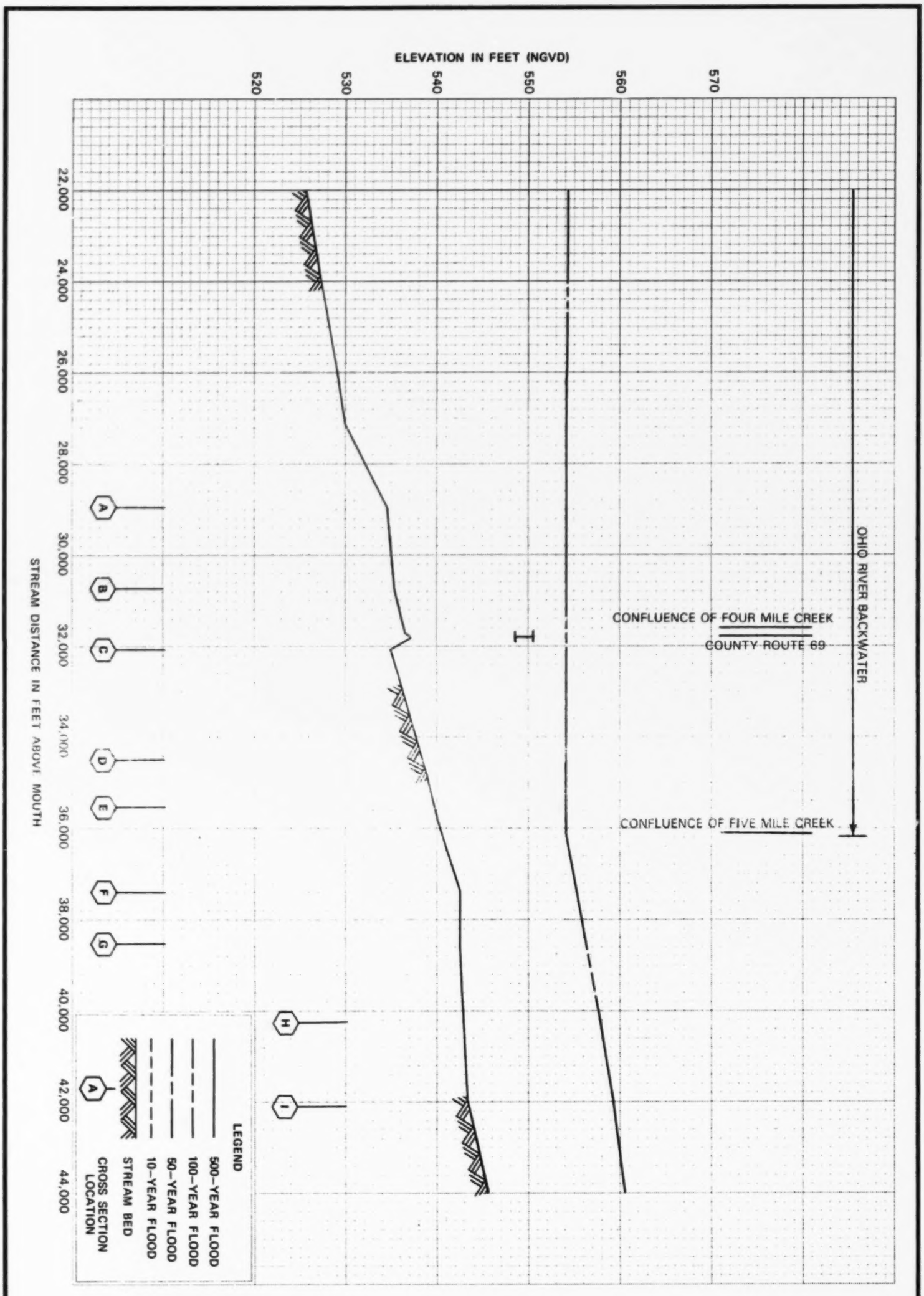
FLOOD PROFILES

INDIAN GUYAN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

03P



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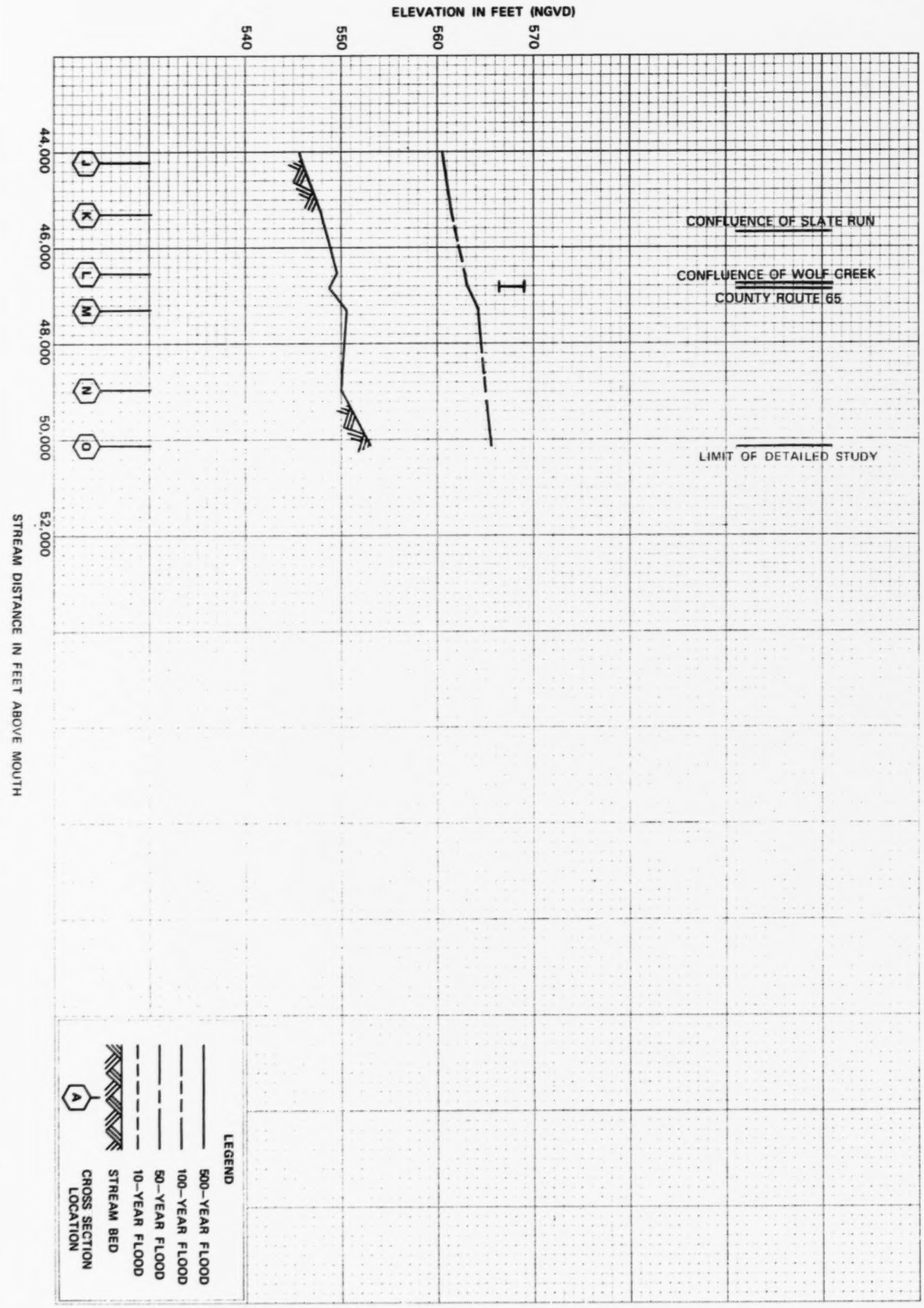

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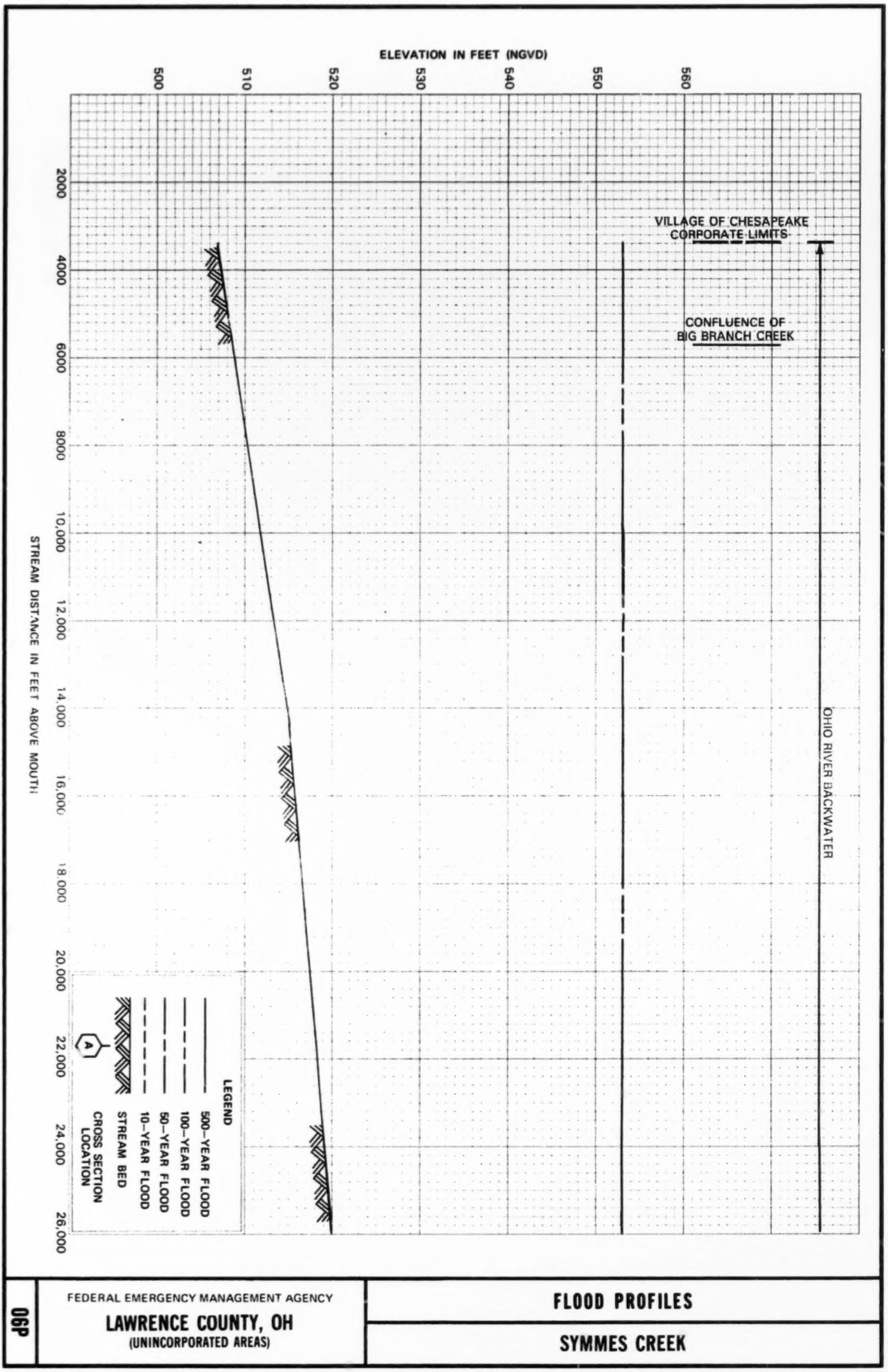
05P

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

INDIAN GUYAN CREEK



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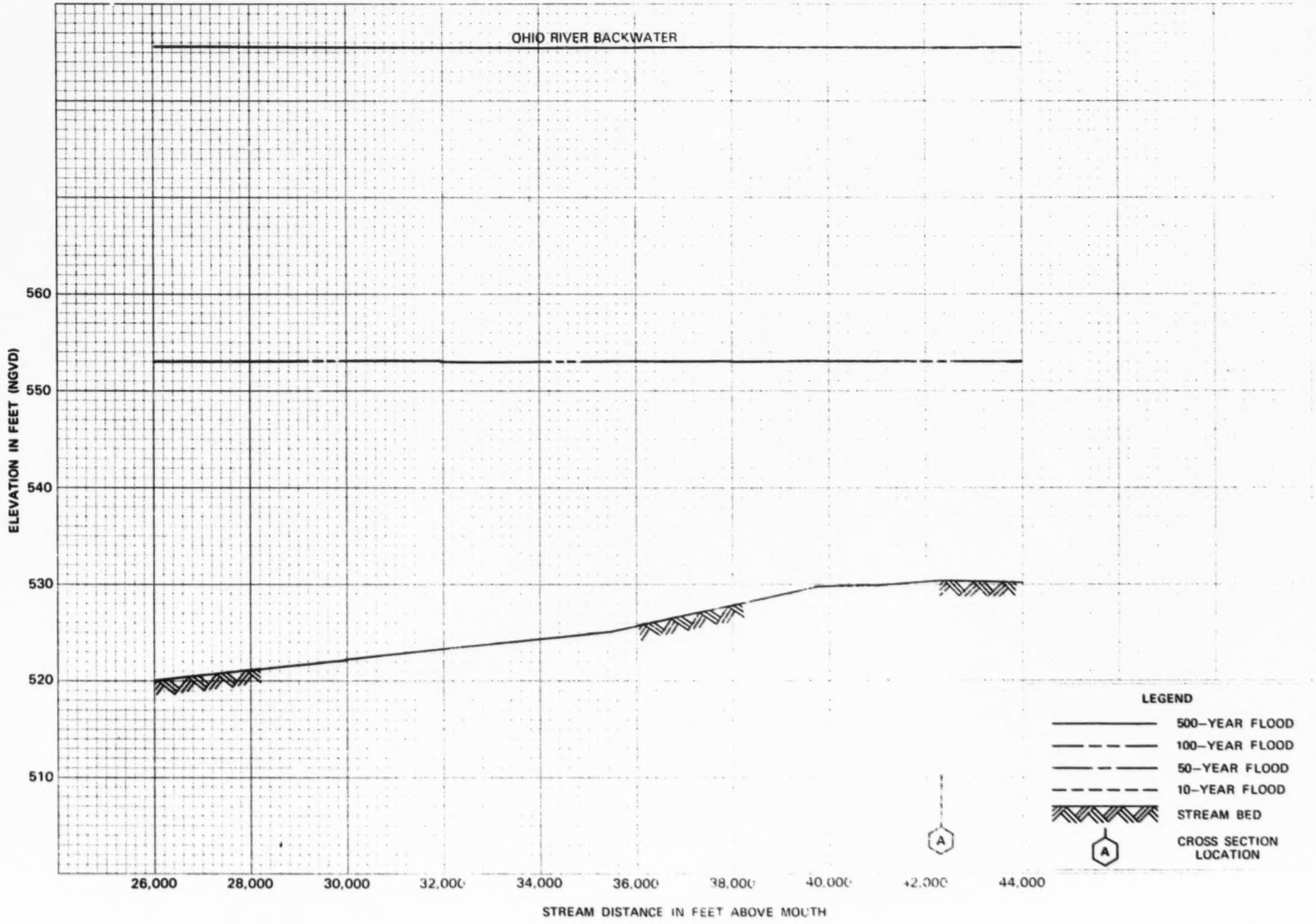
FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

SYMMES CREEK



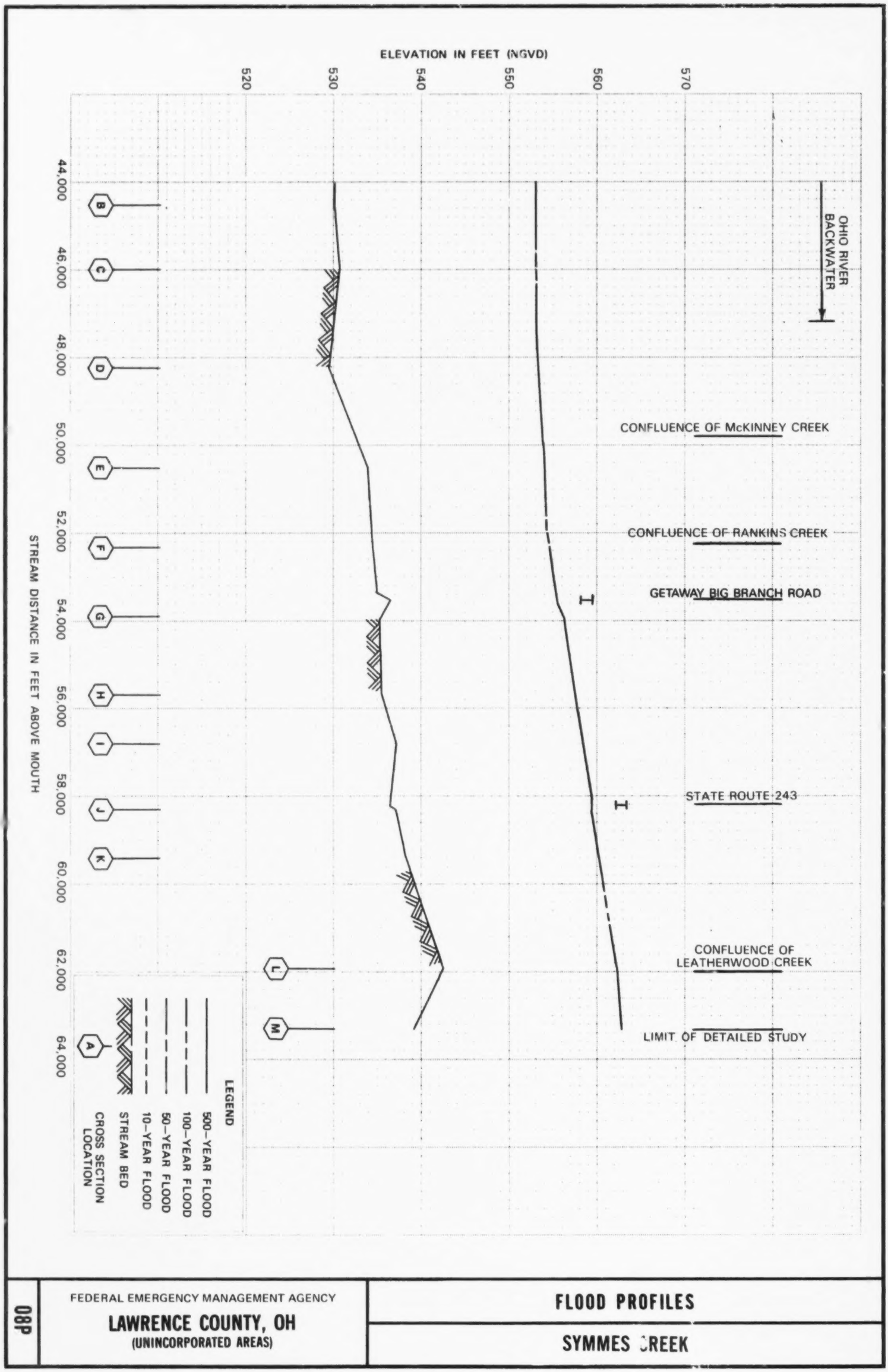
FLOOD PROFILES

SYMMES CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

07P



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08P

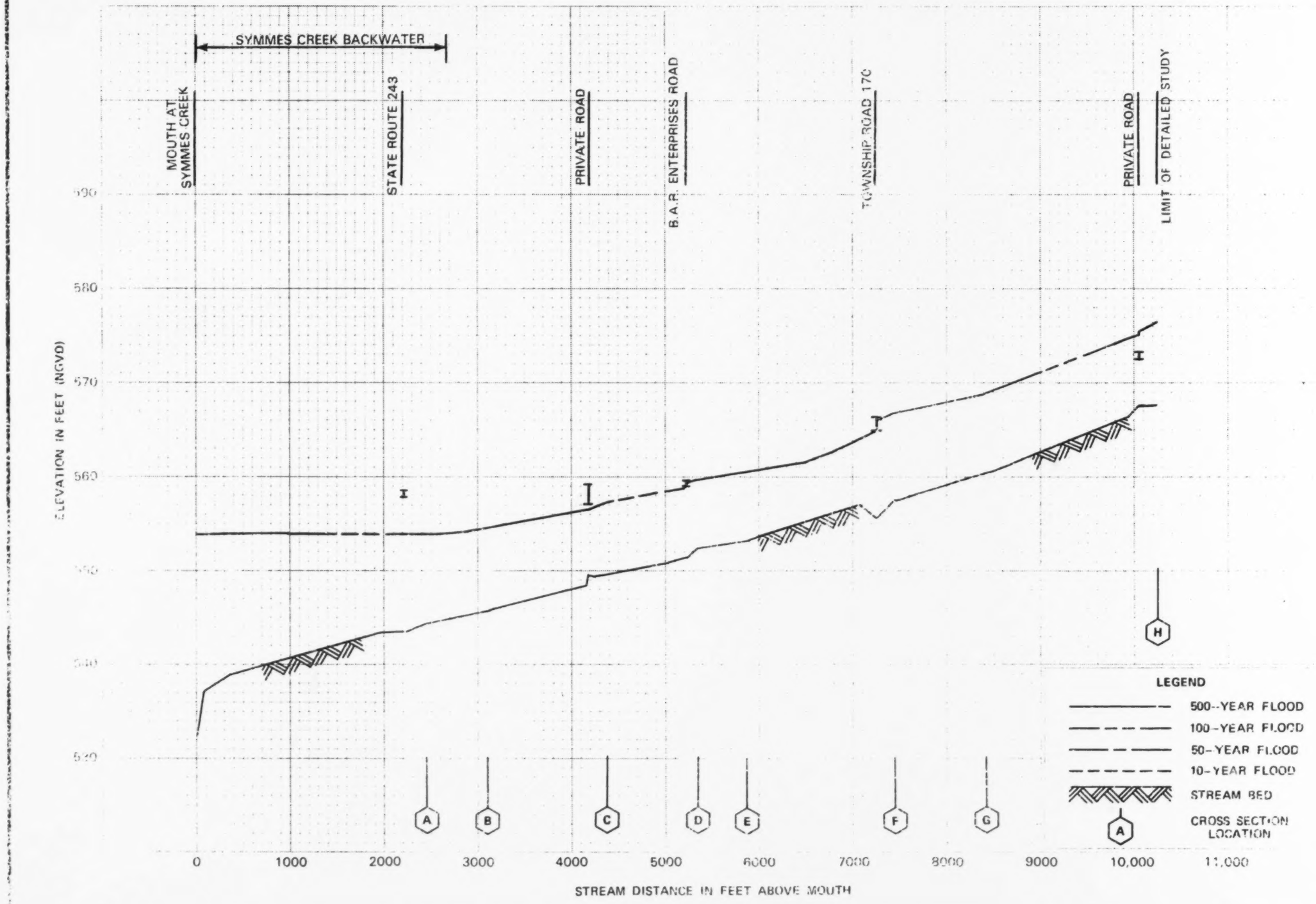
FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH

(UNINCORPORATED AREAS)

FLOOD PROFILES

SYMMES CREEK



FLOOD PROFILES

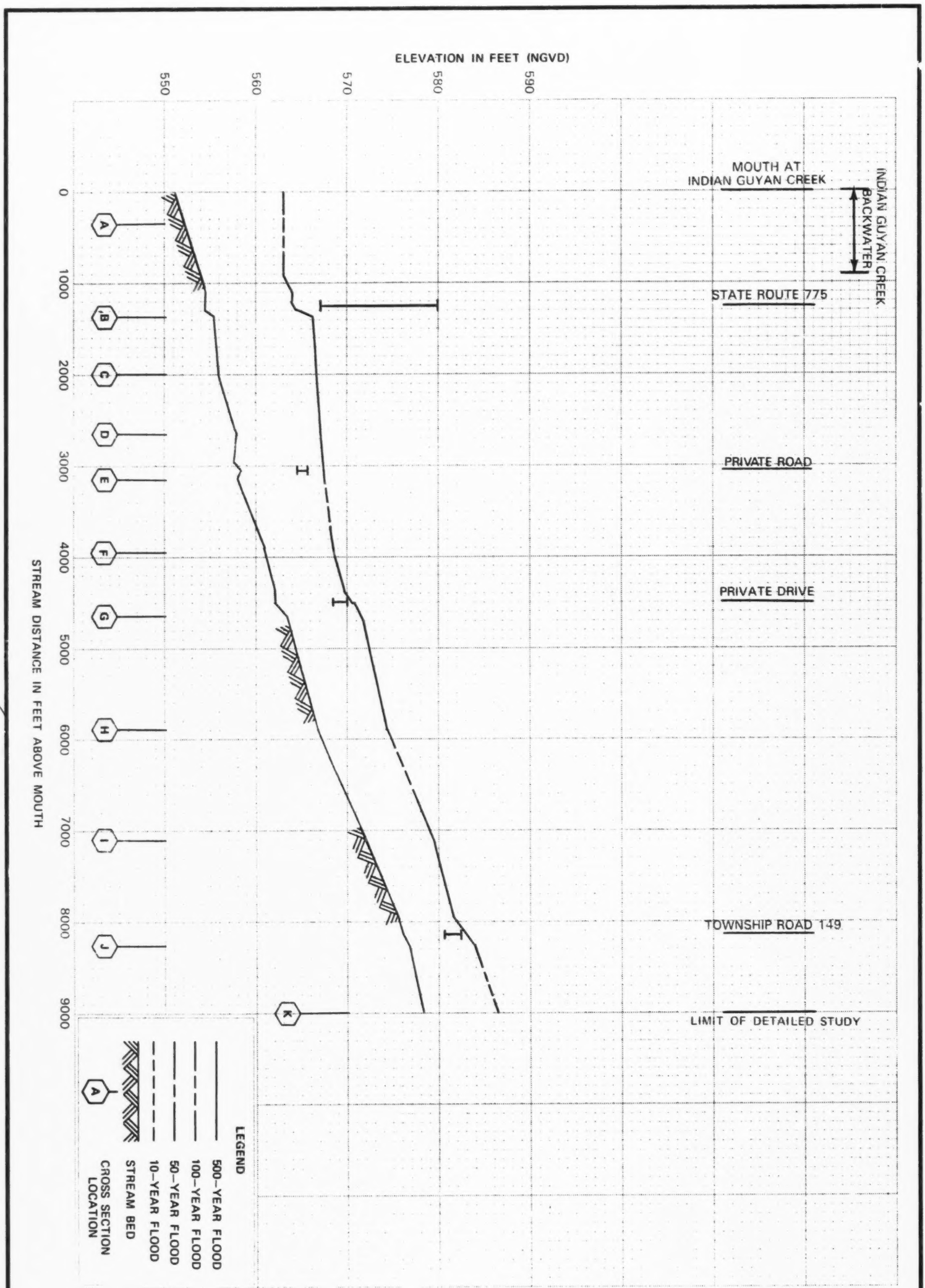
MCKINNEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH

(UNINCORPORATED AREAS)

09P



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FEDERAL EMERGENCY MANAGEMENT AGENCY

LAWRENCE COUNTY, OH
(UNINCORPORATED AREAS)

FLOOD PROFILES

WOLF CREEK